Partner in Growing

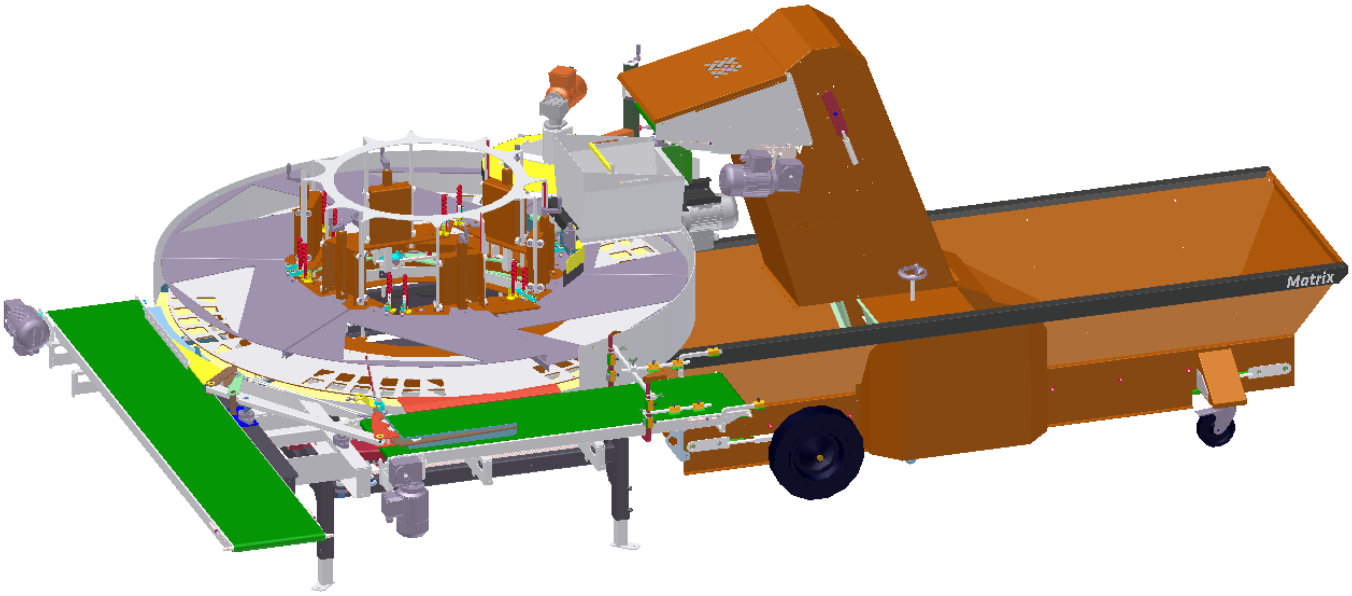
User Manual

Original document

version 2014-1-2

Matrix

Machine nr.: ……



Javo BV
PO Box 21
2210 AA Noordwijkerhout
Holland
T: +31 (0)252 343121
F: +31 (0)252 377423
info@javo.eu
www.javo.eu

© All rights reserved
The information provided herein may not be reproduced and/or published in any form, by print, photo print, microfilm or any other means whatsoever (electronically or mechanically) without the prior written authorisation of JAVO BV.

Preface

This user manual is written for anyone working on or with the machine. Before working on or with the machine, first read this manual.

This user manual contains important instructions / information on how to use the machine in a safe, professional and economical way and must always be available where the machine is used.

In addition to this user manual, the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine must also be observed.

This user manual contains information on the operation of the machine with all the possible options. Use only the information that applies to your machine. Depending on the intensity of use and customer requirements, this machine can be equipped with various options. Contact your sales consultant.

Supplier details if not directly supplied by Javo BV. Dealer stamp:

Javo BV is not responsible for any errors in this manual or the consequences thereof.

Javo BV is not liable for damage or consequential damage caused by operating errors, lack of expert maintenance and any use other than described in this manual.

The liability of Javo BV also expires once modifications or additions are made without written permission of Javo BV.

This machine is suitable for process and environmental conditions as stated in section "Specifications and Tolerances" of this manual. Any other use is not authorized by Javo BV and this allows the operator and / or its environment at risk.

Table of contents

1 Technical specifications and tolerances 4
1.1 Type plate 4
2 Safety 5
2.1 Provisions 5
2.2 Safety devices on the machine 6
2.3 Explanation of icons and symbols 6
3 Description of the manchine 7
..... 7
3.1 Machine overview 7
3.2 Outline drawing with main dimensions 8
3.3 Options 9
3.4 Operation 9
3.5 Machine workstations 9
3.6 Controls 10
4 Transport 11
5 Mounting, installation and commissioning 12
5.1 Placement 12
5.2 Facilities to take care of by the user 12
5.3 Mounting / Connecting 12
5.4 Placing format-set plates 13
5.5 Set height of format-sets 13
5.6 Check rotation direction 13
5.7 Check elevator chain tension 14
5.8 Check substrate conveyor tension 14
5.9 Set substrate conveyor speed 14
5.10 Set compactor height 15
5.11 Set substrate slide height 15
5.12 Set brush height 15
6 Operation 16
6.1 Start 16
6.2 Stop 16
6.3 Emergency stop 16
7 Maintenance 17
7.1 Required tools and equipment 17
7.2 Preventive Maintenance 17
7.3 Elevator cleaning 18
7.4 Test safety circuit 18
7.5 Fault list 19

7.6 Drawings and schemes 19
7.7 Spare parts 20
7.8 JavoNet 20
7.9 Customer support and advice 20
8 Disposal of machine or machine parts 20
9 EG-conformity statement 21

1 Technical specifications and tolerances

This machine is intended to be used for filling trays automatically with substrate only. This machine is meant for processing trays, substrate and other materials that are described in this manual only. Detailed operation of the machine is described in section "Operation".

This machine may be used only within the limits for specifications and tolerances of the order, on the assembly drawing and indicated in this manual. If the machine is used outside these specifications, Javo BV can not take responsibility for this machine.

This machine is intended for products as agreed in the order confirmation only. To ensure the proper operation of this machine, only products with specifications and tolerances as specified in the order may be used.

Do not use the machine for purposes other than the intended purpose of Javo BV. This can lead to damage and danger to the operator and its environment.

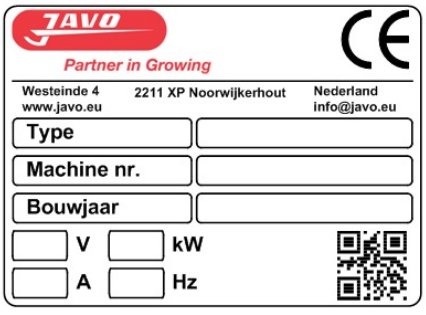
This machine is CE marked. When placing multiple machines in one line, the entire line must be properly CE marked before using this machine. Untill proper CE Marking of the line is carried out, commissioning of this machine is prohibited.

Specifications	
Machine appropriate for	Pots in trays
	Tray length < 600 mm
	Tray width < 400 mm
	Tray height 55-200 mm
Capacity	*450 strokes per hour
Voltage	**400Volt 50Hz 3~+N+ PE
Machine connection	16A 5pole CEE connector
Power consumption	4 kW
Weight	± 1200 kg
Dimensions (LxWxH)	5000x3400x1935 mm
Height conveyor	.. mm
Content substrate bin	700 Litre
Conveyor-belt in	1500x400mm
Conveyor-belt out	2500x400mm
Format-set	6 plates
Year of construction	See type plate
Type product	As agreed in the order confirmation.

* Several crates per stroke possible
** Other possible in consultation

1.1 Type plate

The type plate is placed onto the main cabinet door.



2 Safety

This machine is built according the state of the art technique and the accredited safety regulations. Despite this, the body and life from the user or third parties can be in danger when using it. There could also arise damage to the machine or other goods when using it.

This machine is CE marked. When placing multiple machines in one line, the entire line must be properly CE marked before using this machine. Untill proper CE Marking of the line is carried out, commissioning of this machine is prohibited.

2.1 Provisions

1. Operation and maintenance of this machine must be performed by qualified personnel in compliance with warnings on the machine and in accordance with the user manual. Keep children and other (unauthorized) persons away while using machine.
2. This machine is suitable for process and environmental conditions as stated in section "Specifications and Tolerances" of this manual only. Any other use is not authorized by Javo BV and this allows the operator and / or the environment at risk.
3. It is prohibited to modify this machine, without prior written approval of Javo BV.
4. Thermal fuses and torque limiters may not be set different upon delivery of the new machine. The thermal circuit breakers should never be used to turn on / off the machine.
5. This machine should be installed so that there is sufficient space remaining for providing safe instructions and / or performing maintenance and / or inspections. Put the brakes on the castors before the machine is turned on.
6. Keep the work area clean and well lit. Cluttered or dark areas invite accidents.
7. This machine is not suitable to be used outside. Electrical components are only splashproof. Keep the machine away from rain and moisture. When using the machine in a humid environment is unavoidable, you should use an RCD.
8. Keep hands, hair, loose clothing and / or jewelry away from moving parts of the machine. Wear appropriate clothing without loose parts. Wear non-slip work shoes.
9. As long as the machine is on, no connection or safety devices may be removed. The machine may only be used when all protective devices and safety-related facilities are available and ready for use.
10. The automatic moving arms move trays in and out the filler, are pinnate suspended to avoid serious injury when touched. Nevertheless it is possible to get injured when touching. Stay away from moving parts while the machine is turned on.
11. Do not stand on the machine when it is operating.
12. Never move the machine if the power cable and / or pneumatic supply is still connected.
13. Prescribed checks and maintenance in the user manual must be observed.
14. Allow the machine to be serviced and repaired by qualified personell only with original replacement parts.
15. In addition to the user manual, generally applicable statutory and other regulations regarding accident prevention and environmental protection have to be respected. This is also referred to handling of personal protective equipment.
16. Inform operating personnel before start maintenance. Interrupt if possible the power (mains), before start machine investigation or maintenance by turning off the main switch and locking the main switch. Pull the plug from the wall socket.
    a. As work must be done with power supply (mains) voltage on the machine, then arrange an additional person who can operate the emergency stop.
17. When a machine part is damaged or not working in the prescribed manner, the work must be interrupted immediately. Resumption allowed only when the machine part is repaired or replaced and checked. Consult your dealer if the machine is not functioning properly.
18. Machine and / or parts must be disposed in accordance with local laws and regulations.

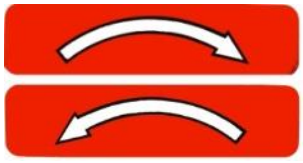
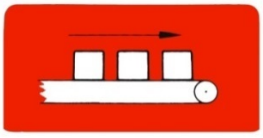
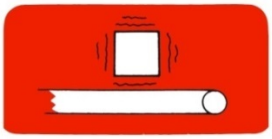
2.2 Safety devices on the machine

Caps and doors are screening moving parts. Always place back caps and close doors before the machine is turned on. Caps and doors should remain closed while operating the machine.

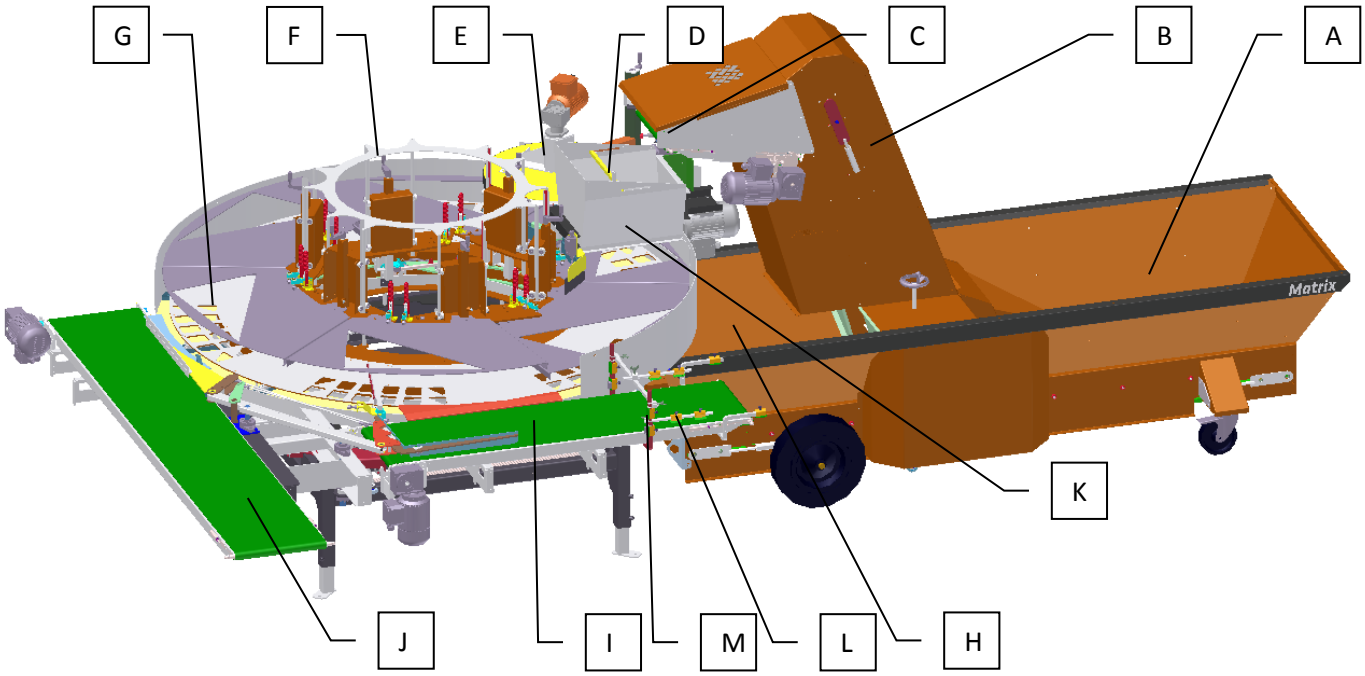
The motors of the machine are protected against overload by thermal switches. These switches are located in the control box.

2.3 Explanation of icons and symbols

Pictogram	Meaning
	Read and understand this manual before using the machine and / or performing maintenance.
	Remove Power (mains).
	Wear during all work on or with the machine safety shoes and safety glasses.
	Wear during cleaning and maintenance work on this machine also safety gloves and protective clothing.
	Warning. Important points and / or instructions regarding safety and / or injury prevention are marked with this warning sign.
	Dangerous electrical voltage. Dangerous electrical voltage present.
	Risk of crushing. Danger of moving or rotating parts.
	It is forbidden to wear Loose clothing, long hair and / or jewelry nearby moving parts of the machine.
	Trespassing.
	Do not rinse control cabinet Danger of moisture in the cabinet when it is rinsed with water.

Symbols that may be present on this machine			
Drill	Direction of movement 	Speed ground feeder (curved)	Speed ground feeder (straight)
Speed pot belt (curved)	Speed pot belt (straight)	Brush disc Rotofill	Tray belt Rotofill 
Rotor Rotofill 			

3 Description of the manchine

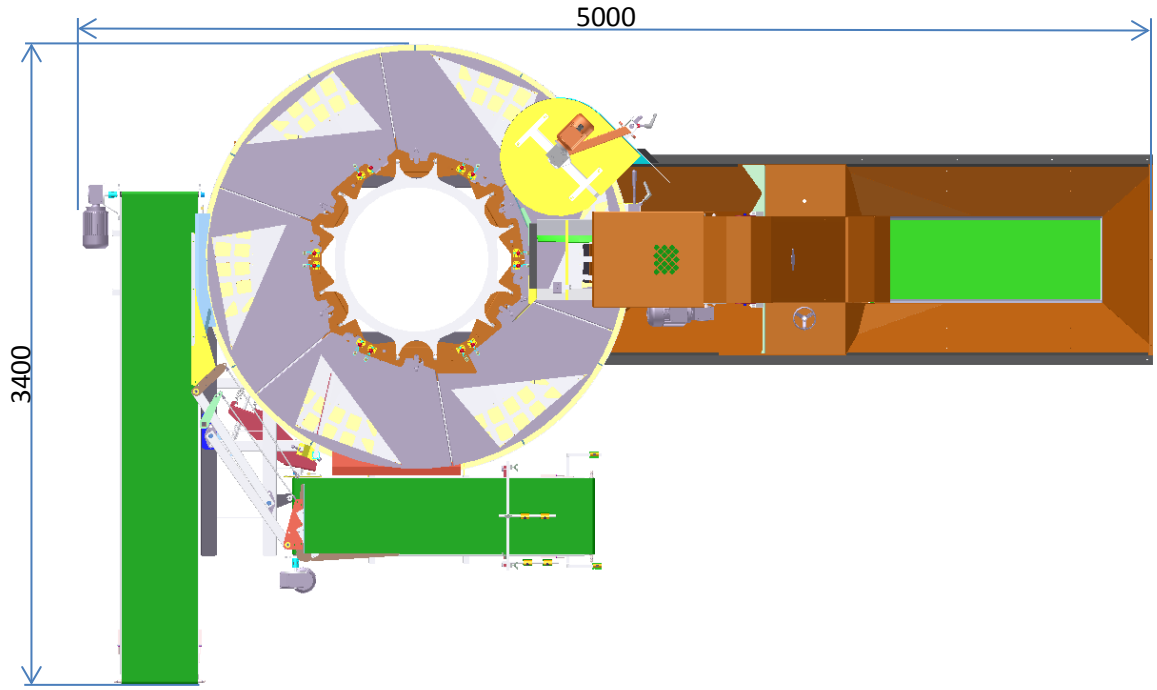


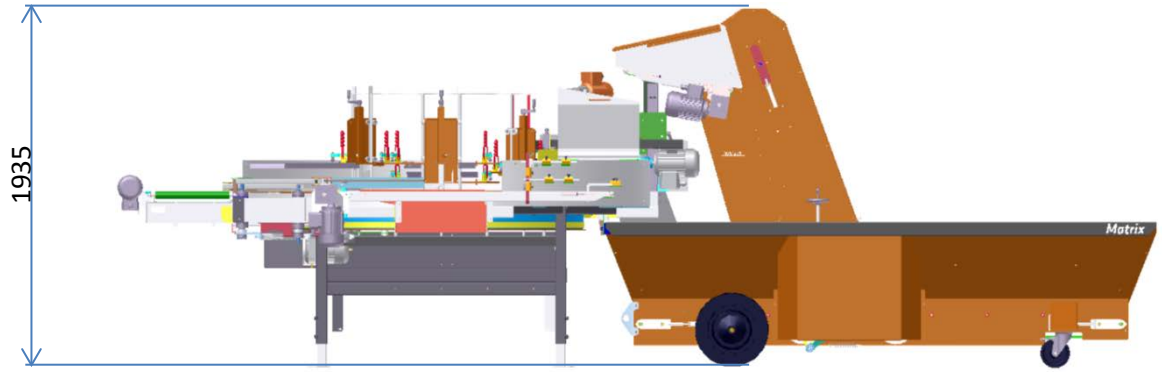
3.1 Machine overview

A. Substrate bin
B. Elevator *
C. Exit substrate
D. Substrate entrance in carousel
E. Brush unit*
F. Format-set plates exchange position
G. Format-set plate
H. Substrate retour conveyor
I. Tray entrance conveyor
J. Tray exit conveyor
K. Rotor
L. Mitre check (option) (4 focus sensors)
M. Tray check (height check)

* Moving parts of the machine are protected by hoods and doors when the machine was delivered.

3.2 Outline drawing with main dimensions





3.3 Options

Depending on the intensity of use and customer requirements, this machine can be equipped with various options. Contact your sales consultant.

Options	Code	Specifications
4 meter 5x1.5 cable incl. 16A plug	900965	
10mtr 5x1.5 cable, incl. plug and connector	901467	
20mtr 5x1.5 cable, incl. plug and connector	901201	
Substrate bin increase	JMTX GB OPZ	
Format-set (6 plates) for other tray dimensions or other tray pattern	JMTX PB FOR	
Machine in 2 colors (RAL), 1 main color en 1 spot color	JPME DIV KL	
Mitre control system	JPME EL VC	
Extra power outlet with constant power supply	JPME EL WCDC	
Extra power outlet with switching power supply	JPME EL WCDG	
Application machine without '0' in net	JPME EL ZNUL	
Phase sequence protection	JPME EL FB	

3.4 Operation

The soil bin is filled with substrate. Substrate is transported with the substrate conveyor to the elevator. The elevator transports substrate with a conveyor to the rotor.
Trays with are provided through the tray infeed conveyor.
The rotor divides substrate evenly over the full width of the tray, in the cells / pots of the tray. An equal amount of substrate is divided in all the tray cells/ pots.
The filled tray is transported and passes a substrate slide. At the substrate slide, the excess substrate is removed from the tray. The tray is then evenly levelled by the brush unit.
The remaining substrate on top of the format-sets is returned to the ground retour conveyor with a brush unit.
Trays are transported further, and finally fed out at the tray exit conveyor.
The machine is equipped with wheels, which makes the machine easy to move.

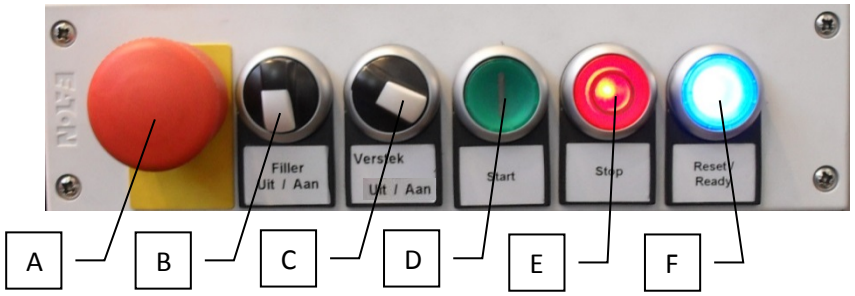
3.5 Machine workstations

This machine has two operator places; at the start of the infeed conveyor belt, and at the end of the outfeed conveyor belt.

3.6 Controls

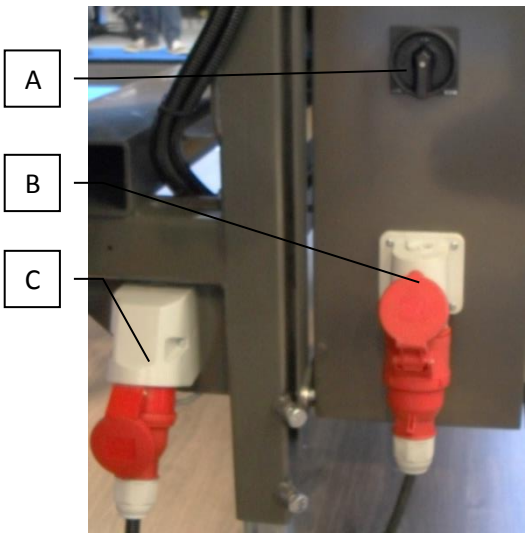
The machine is controlled with the control panel. This control panel is flexible around the machine to be used by means of a cable. The control panel consists of the following buttons;

A. Emergency stop button
B. Filler off / on switch
C. Miter off / on switch
D. Start button
E. Stop button
F. Reset button



At the electrical cabinet of the machine, these buttons and connectors are placed:

A. Main switch
B. Power mains cable
C. Power transit cable



The machine is equipped with emergency stop buttons:

D. Emergency stop button

For changing Format-sets, the machine fence can be removed. The machine will stop automatically.

To rotate the carousel to the next position, use the 2-hand control buttons.

4 Transport

Follow all instructions described in this manual, in particular chapter safety.

On delivery of the machine, a Javo mechanical engineer must be present to unload the machine from the (freight) wagon.

Prior to moving the machine, the electrical and pneumatic power should be disconnected. Make sure the cables are stowed sufficiently.

When moving within the company (when the machine does not need to be lifted) the state of the machine should be checked. Make sure the path to be traveled is free, so the machine can be moved to the desired position without obstacles.

If the machine is to be lifted for movement (outside the company), please contact your dealer or contact a professional shipping company.

The machine must be transported upright. The relative humidity should not be too high so that water condenses in the machine.

Report damage during or immediately after delivery to the transport company and to Javo BV. Take all necessary steps to prevent further damage.

5 Mounting, installation and commissioning

Follow all instructions described in this manual, in particular chapter safety.

This machine is CE marked. When placing multiple machines in one line, the entire line must be properly CE marked before using this machine. Up to CE Marking of the line, commissioning of this machine is prohibited.

The automatic moving arms move trays in and out the filler, are pinnate suspended to avoid serious injury when touched. Nevertheless it is possible to get injured when touching. Stay away from moving parts while the machine is turned on.

5.1 Placement

The machine must be placed on a flat surface, with sufficient weight capacity. Install the machine so that there is enough space left for service providing, safe instructions and / or cleaning, maintenance and / or inspections. Put the brakes on the castors before the machine is turned on.

This machine is not suitable to be used in the open air. Electrical components are only splashproof. Keep the machine away from rain and moisture. When using the machine in a humid location is unavoidable, you should use an RCD.

5.2 Facilities to take care of by the user

Prior to delivery of the machine, the required materials and facilities (air, power, substrate, etc.) needs to be present within 3 meters of machine.

Required power supply: 400 Volt, 3 Phase + Neutral + Earth. (N. America: 208/220V 60Hz.).

5.3 Mounting / Connecting

If applicable, the components supplied are to be mounted on the machine. Make sure that the moving parts are free. If the machine is complete, it can be connected (by a competent person) to the power supply.

Keep hands, hair, loose clothing and / or jewellery away from moving parts of the machine. Wear appropriate clothing without loose parts. Wear non-slip work shoes.

As long as the machine is on, no connection or safety devices may be removed. The machine may only be used when all protective devices and safety-related facilities are available and ready for use.

5.4 Placing format-set plates

For placing Format-sets, the machine fence can be removed. The machine will stop automatically.

To rotate the carousel to the next position, use the 2-hand control buttons.

Placing format-set plates is easy. The dowel pins on the plates should be placed in the recesses.

5.5 Set height of format-sets

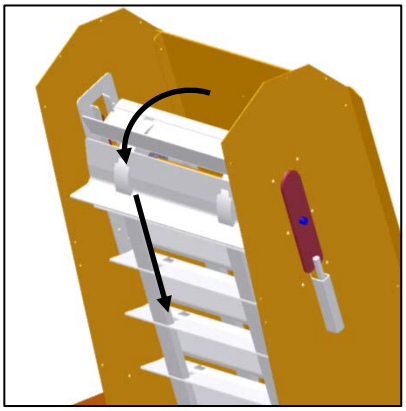
Check the height of the format-sets compared to the rotorbin and substrate slide before you start working with the machine. When changing format-set plates, the height needs to be adjusted.

On the deposit place for format-set plates, the height of the set in relation to the substrate slide and rotorbin is visible. If the plates are positioned too high, plates run against a sensor that will turn off circulating movement of the machine.

In order to prevent that this sensor is turned on, set the format-set plates at the appropriate height in relation to the substrate slide and rotorbin for every format-set plate. Use the handles above the format-set to set the correct height.

5.6 Check rotation direction

Check the rotation direction of the elevator before you start working with the machine.

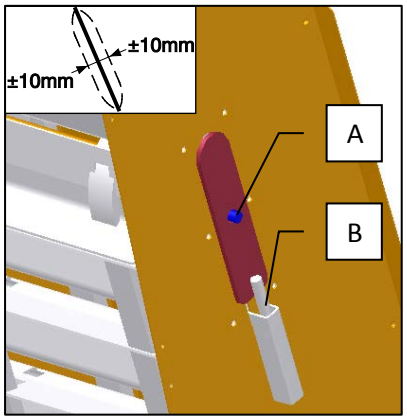


Procedure:

1. Connect the power cable.
2. Start the elevator.
    a. Turn on the main switch.
    b. Press the reset button emergency stop circuit.
    c. Start the elevator with the elevator button.
3. Check the direction of rotation of the elevator.
4. Stop the elevator by turning the filler off.
5. Turn off the main switch.
6. When rotation direction is incorrect:
    a. Remove the plug from the socket.
    b. Open the plug and switch 2 of the 3 phases in the plug. This should only be carried out by suitably qualified personnel.

5.7 Check elevator chain tension

Check the elevator chain tension before you start working with the machine.



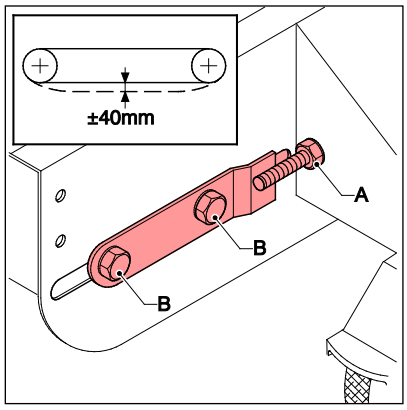
Procedure:

1. Check the elevator chain tension. The correct tension is obtained when the chain in the middle deflects ± 10mm.
2. Adjust the chain tension if necessary .
    a. The tension can be adjusted using the two clamping nuts, located on opposite sides of the elevator housing.
    b. Tighten the nuts (A) on both sides of the elevator equally.

The tension of the chain should not be too tight.

5.8 Check substrate conveyor tension

Check the substrate conveyor belt tension before you start working with the machine.

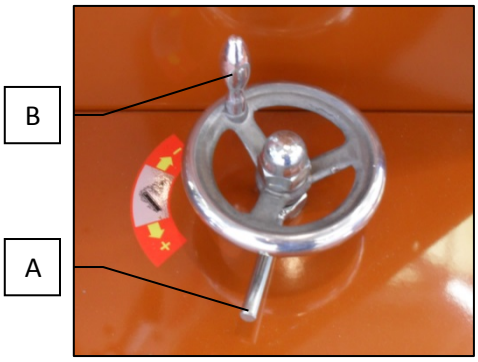


Procedure:

1. Check the substrate conveyor belt tension. The correct tension is obtained when the belt in the middle deflects ± 40mm.
2. Adjust the belt tension if necessary .
    a. Loosen the four screws (B) to the block bearings.
    b. The tension can be adjusted by simultaneously turning both sides of the ground belt (A).
    c. Tighten the four screws (B) to the block bearings.

5.9 Set substrate conveyor speed

Set the substrate conveyor speed before you start working with the machine.



Procedure:

1. Check the substrate conveyor speed. Set the speed in this way that trays are being filled sufficiently before they reach the substrate slide.

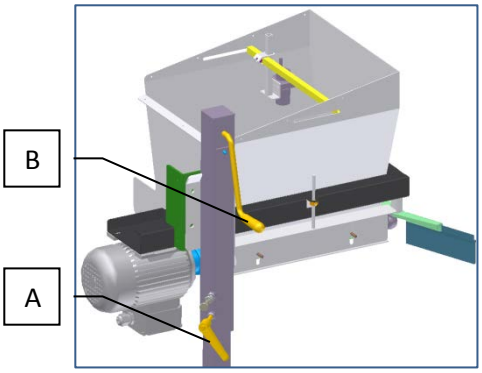
Only adjust the substrate conveyor speed when motors are running.

If the level sensor for the substrate conveyor will not occasionally turn off, then the speed of the conveyor is set too low.

2. When the speed needs to be adjusted:
    a. Loosen locking bar (A).
    b. Turn wheel (B):
        i. CCW = substrate conveyor will run slower.
        ii. Clockwise = the speed of the conveyor is increased.
    c. Tighten locking bar (A).

5.10 Set compactor height

Set the compactor height before you start working with the machine.



Procedure:

1. Check the compactor height with respect to the tray.

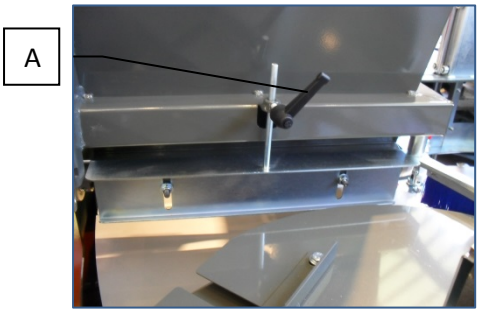
The compactor should not touch the format-set plates. There should be a gap of about 10mm.

2. If the height is incorrect:
    a. Loosen clamp (A).
    b. Turn the compactor to the desired height with crank (B).
        i. The lower the compactor is over the tray, the harder the ground tension will be.
        ii. The higher the compactor is over the tray the softer the ground tension will be.
    c. Tighten clamp (A).

The substrate slide moves with the height adjustment of the rotorbin. Adjust slide after setting the rotor height.

5.11 Set substrate slide height

The substrate slide is placed after the compactor. The substrate slide has the function to shift the excess of substrate off the tray.



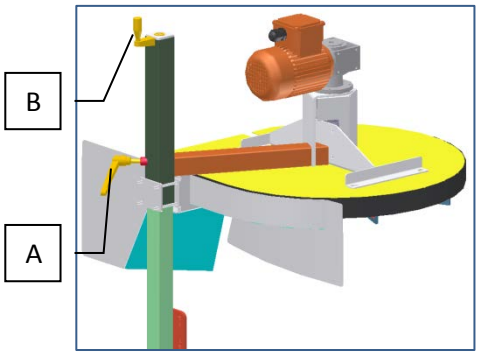
Set the position of the substrate slide before you start working with the machine.

Procedure:

1. Check the height of the substrate slide with respect to the tray. The slide should be placed approximately 15mm above the tray.
2. If the height is incorrect:
    a. Loosen wing nut (A).
    b. Set the substrate slide to the desired height.
    c. Tighten wing nut (A).

5.12 Set brush height

Set the brush height before you start working with the machine.



Procedure:

1. Check the height of the brush with respect to the tray. The slide should be placed approximately 5mm above the tray. The brush is intended to evenly level the substrate in the tray.
2. If the height is incorrect:
    a. Loosen clamp (A).
    b. Set the desired height using crank (B).
    c. Tighten clamp(A).

6 Operation

Follow all instructions described in this manual, in particular chapter safety.

Keep hands, hair, loose clothing and / or jewelry away from moving parts of the machine. Wear appropriate clothing without loose parts. Wear non-slip work shoes.

As long as the machine is on, no connection or safety devices may be removed. The machine may only be used when all protective devices and safety-related facilities are available and ready for use.

If a machine part is damaged or not working in the prescribed manner, work must be interrupted immediately. Resumption allowed only when the machine part is repaired or replaced and checked. Consult your dealer if the machine is not functioning properly.

The automatic moving arms move trays in and out the filler, are pinnate suspended to avoid serious injury when touched. Nevertheless it is possible to get injured when touching. Stay away from moving parts while the machine is turned on.

6.1 Start

Start procedure:

1. Turn on the main power at the electrical cabinet.
2. Turn on the filler.
3. Press the blue reset button.
4. Press the green start button to start the machine.

6.2 Stop

Stop procedure:

1. Press the red stop button on the control panel.

6.3 Emergency stop

Emergency stop procedure:

1. Press the red emergency stop button on the machine to activate the emergency stop.

Restart after emergency stop procedure:

1. Ensure that the cause of the emergency is resolved.
2. Close all doors and covers.
3. Pull the red emergency stop button to reset.
4. Press the reset button.
5. Press the green button on the control panel to start the machine.

7 Maintenance

Follow all instructions described in this manual, in particular chapter safety.

Maintenance of this machine must be performed in compliance with warnings on the machine and in accordance with the user manual by qualified personnel.

Keep hands, hair, loose clothing and / or jewelry away from moving parts of the machine. Wear appropriate clothing without loose parts. Wear non-slip work shoes.

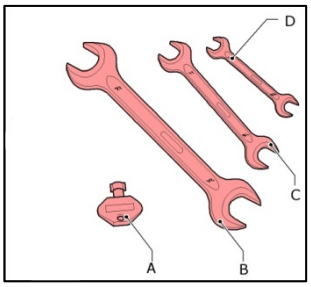
As long as the machine is on, no connection or safety devices may be removed. The machine may only be used when all protective devices and safety-related facilities are available and ready for use.

Always unplug the plug from the socket before starting maintenance. Wear personal protective equipment (see section 2.3).

Inform operating personnel before start maintenance. Interrupt if possible the power (mains), before the machine is investigated or maintained by turning off the main switch and locking it and pull the plug from the socket. If work must be done with power supply (mains) voltage on the machine, work with an additional person who can operate the emergency stop.

7.1 Required tools and equipment

A set of keys is included with the machine, consisting of:



A. Door key
B. Spanner 24-27mm
C. Spanner 17-19mm
D. Spanner 10-13mm

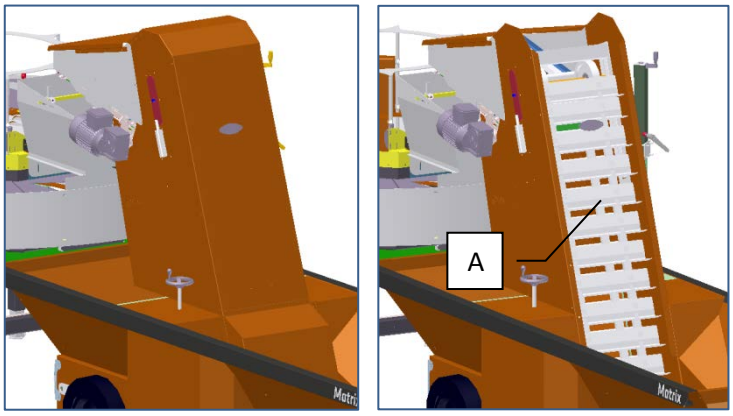
7.2 Preventive Maintenance

For the following maintenance instructions normal use is considered. With heavy use, or use under extreme conditions, maintenance should be performed at shorter intervals.

Item	1x per...	Comments
Machine	Day	Check if moving parts are functioning correctly and not clamping and / or parts are broken or damaged in such a way that the operation is adversely affected. Have damaged parts repaired before use.
Elevator and belts	Day	Check tension. See section “Mounting, installation and commisioning”.
Materials in the machine	Day	Remove trays or other material that has fallen into the machine before starting the machine.
Safety components	Week	Test the safety circuit. See section “Test safety circuit”.
Pictograms	Week	Check readability and replace if necessary.
Elevator	160 hour	Cleaning. See section “Elevator cleaning”.
Electrical installation	Year	Check for damage.
Electric motors	Year	Remove dust.

7.3 Elevator cleaning

The blades of the elevator must be cleaned regularly in order to prevent excessive wear.



Procedure:

1. Loosen the two guards of the elevator, using the supplied door key and remove it from the machine.
2. Spray the blades of the elevator (A) and the elevator chain with compressed air.
3. Attach the two guards of the elevator, using the supplied key, on the machine.

7.4 Test safety circuit

Procedure:

1. Start the machine.
2. Press the emergency stop button. The machine is now disabled.
3. Pull the Emergency Stop button. The machine remains off.
4. Press the reset button emergency stop circuit. All possibly connected conveyors start moving.
5. Start the machine

The machine must not be used when going through the above process, the machine responds differently than described above. Warn directly Javo BV.

7.5 Fault list

Problem	Possible cause	Action / Solution
Motor fault	mains voltage deviates more than 10% of the rated motor voltage	Provide the correct voltage
	Too high cooling air temperature	Provide cool air
	Poor cable connection	check the cable connection and repair if necessary
	Blown fuse	Replace fuse
	Too little cooling air caused by a clogged cooling air passage	Ensure proper inlet and outlet of the cooling air
The motor hums and takes too much power	Defect winding	Repair or replace the motor winding
	Loose wire	Lock wire
Fuses are blown	Short circuit in wiring or motor	Rectify the short circuit
	Motor short circuit to housing or has a short in the windings	Turn to a repair shop to fix the short circuit
	Motor is connected incorrectly	Connect the motor correct
Minimum substrate in the trays	Too little substrate in the bin	Fill the bin with substrate
	Elevator provides little substrate	Set the substrate conveyor faster
Machine does not start	Door safety switch is open	Close door and reset the safety circuit by pressing the reset button
	Emergency stop button is not pulled	Pull Emergency Stop button and reset the safety circuit by pressing the reset button
	Emergency stop button not reset	Reset the safety circuit by pressing the reset button
	Breaker tripped in main cabinet	See why circuit breaker has tripped. Remove obstacles to conveyors. Switch on the machine after solving the problem.
	Cable length too large causing voltage loss	Reduce cable length
	Voltage fluctuations caused by other devices on the same group	Ensure the correct voltage. Turn off other devices
	Control switch for height format sets is operated.	Set Format-set so height in a way that sensor remains down.
		Remove excess soil at the sensor.
		Remove misfed trays.

7.6 Drawings and schemes

The drawings accompanying this machine are supplied in a separate file. The wiring diagrams are included in the electrical cabinet of the machine.

7.7 Spare parts

Only original spare parts and accessories of Javo BV may be used on the machine.

Javo BV advises you to take certain parts in stock because of wear sensitivity and / or any expected downtime for re-ordering of the parts.

The spare parts list can be found on the assembly drawings. These can be found on JavoNet.

When ordering (spare) parts at Javo BV, the following information must be included: drawing number, item number, desired length (if applicable) and the desired number of pieces.

7.8 JavoNet

We recommend you to register your machine on JavoNet. This way you get online access to all technical drawings and documents pertaining to your machine.
Visit our website (www.javo.eu) for more information and to request an account.

7.9 Customer support and advice

Our technical department will answer your other questions about repair and maintenance of your machine and spare parts. We can help you with any questions regarding the purchase, use and settings of products and accessories.

8 Disposal of machine or machine parts

Follow all instructions described in this manual, in particular chapter safety.

Perform the following steps when disposing the machine:

1. Decommission the machine and remove electric and pneumatic power.
2. Drain and remove all consumables.
3. Scrap the machine according to the local legislation.

9 EG-conformity statement

EG-conformity statement for machines (directive 2006/42/EG, annex II, under A.)

CE

Javo BV
Westeinde 4
2211XP Noordwijkerhout
The Netherlands

Declares that:

Machine: ***Matrix***
Type:

is in accordance with the **Machine directive 2006/42/EG** and complies with the provisions of the **EMC-directive 2004/108/EEG**

Complies with the harmonized European Standards:

Harmonized European standard	definition	Harmonized European standard	definition
NEN-EN-ISO 12100:2010	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology	NPR-ISO/TR 14121-2:2010	Safety of machinery - Risk assessment - Part 2: Practical guidance and examples of methods
NEN-EN-ISO 13857	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs	NEN-EN-ISO 13849-1	Safety of machinery - Parts of Control Systems with a safety function - Part 1: General principles for design
NEN-EN-IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements	NEN-EN 13850	Safety of machinery - Emergency stop - Principles for design

The Netherlands, Noordwijkerhout,
October 2014

Cees Bouwmeester
Director